Adaptrum CR Prototype System Brief Manual

I. System startup

1. Start Matlab.

2. Set library path and enter working directory:

```
>> cd D:\Project\Adaptrum_Matlab_FuncLib
>> set_path
>> cd D:\Project\QUSB\Matlab
```

Refer to the following screen shot:

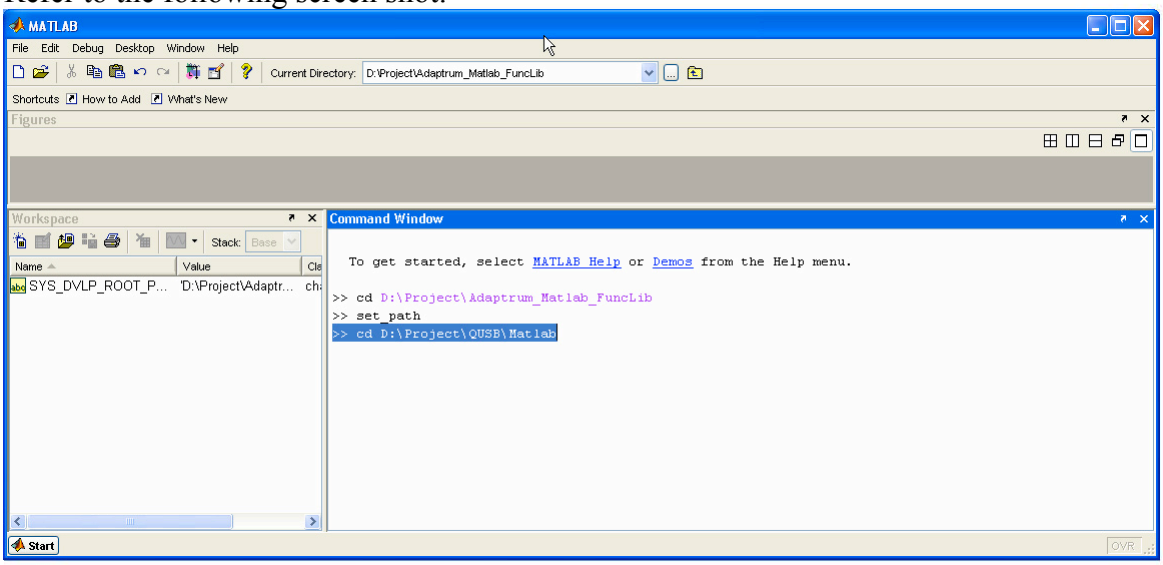

Figure 1: Matlab initialization.

All commands will be executed from directory "D:\Progject\QUSB\Matlab" where all the relevant Matlab scripts are located.

3. Turn on the prototype system.

4. Make sure the USB is connected to the prototype system. Start the Adaptrum CR platform IDE GUI:

```
>> adaptrum_cr_platform_ide
```

The main Adaptrum CR platform GUI should be shown:

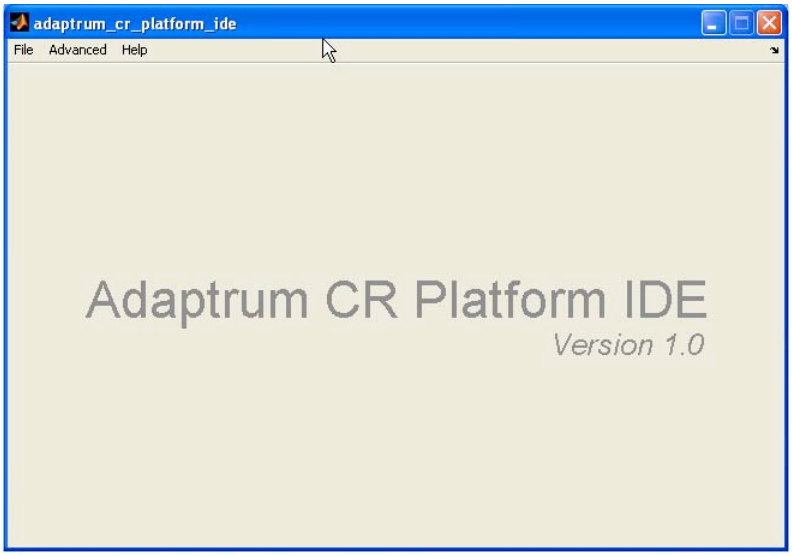

Figure 2: Adaptrum CR platform IDE GUI.

5. Reload firmware.

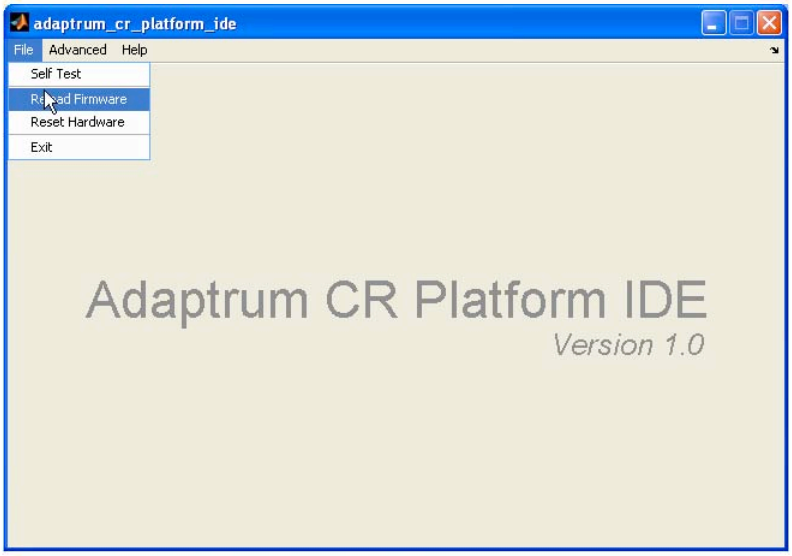

Figure 3: Reload firmware.

When prompt, select "D:\Project\Firmware\cr_prog.m" for program image and "D:\Project\Firmware\cr_data.m" for data image.

6. Reset hardware.

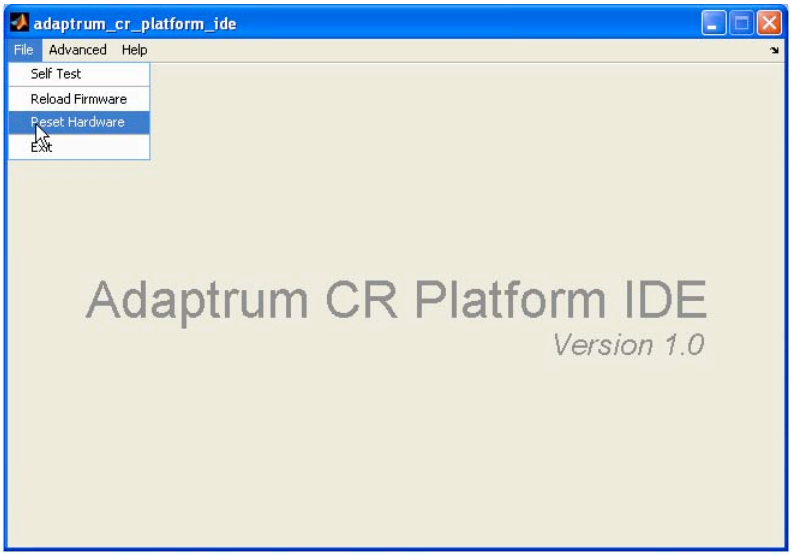

Figure 4: Reset hardware.

The system is now up. Note that above startup routine should only be performed once before measurements.

II. Measurements

7. The system must be tuned to a particular channel before measurements. To tune the system to a particular channel, use

```
>> Acpi_ChannelSetup(48)
```

Here we tune the system to Channel 48 at 677 MHz. The valid Channel range is from 14 to 69. Once the channel is tuned, the following measurements can be carried out.

8. To plot the channel spectrum, use

```
>> Acpi_ChannelSpectrumPlot(48)
```

The following figure shows the measured signal spectrum centered at Channel 48.

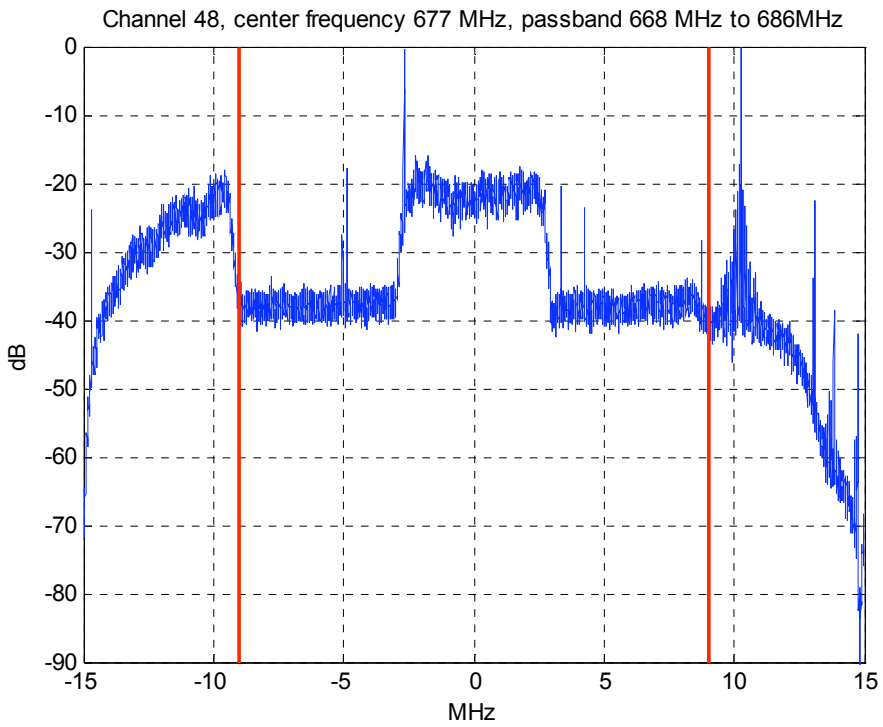

Figure 5: Measured signal spectrum.

9. To perform NTSC signal scan, use

```
>> [ntsc_scan_result] = Acpi_ChannelScanNTSC
```

Here "ntsc_scan_result" is a 3 element array reporting whether Channel 47, 48, 49 contain NTSC signals respectively.

10. To perform ATSC signal scan, use

```
>> atsc_scan_result = Acpi_ChannelScanATSC(32)
```

Here the argument "32" to "Acpi_ChannelScanATSC" allows to specify how many ATSC scan attempts to be performed, e.g. 32. The results of the attempts are stored in the array "atsc_scan_result". Use

```
>> sum(atsc_scan_result)
```

to see how many scan attempts result in positive ATSC signal detections. The maximum value of the argument is 256. The following figure is a screen shot of a typical run.

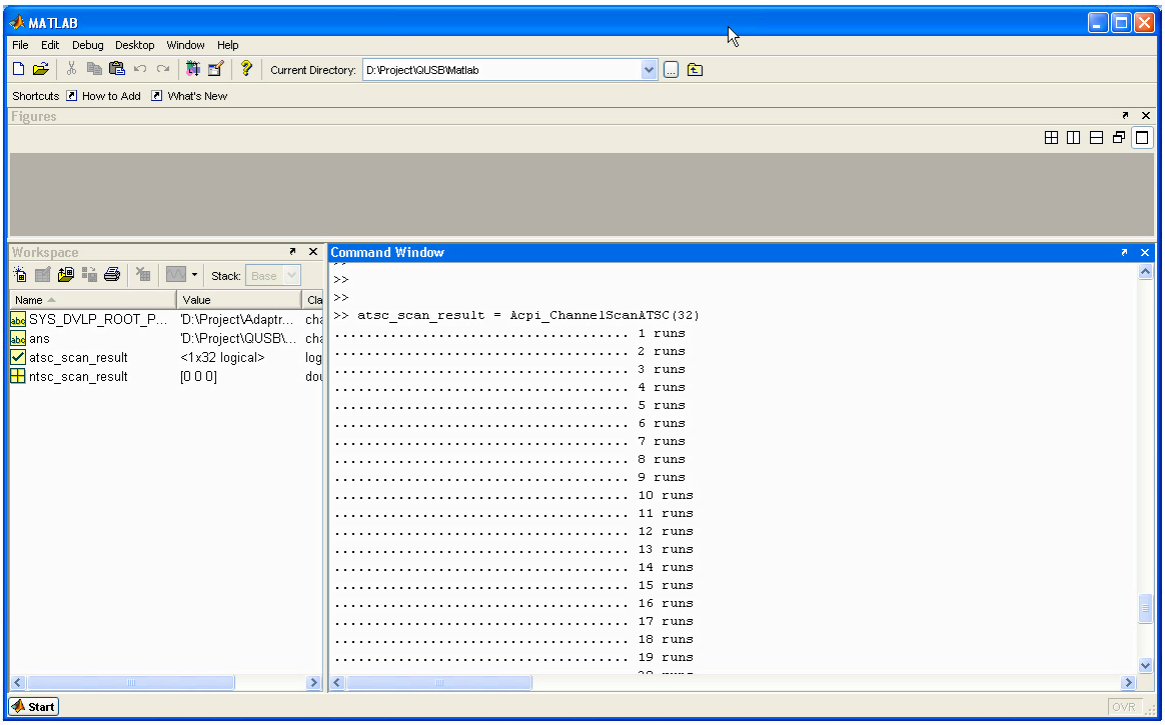

Figure 6: Example ATSC scan run.

III. Transmit

11. To transmit on a particular channel, use

```
>> Acpi_ChannelTx(48)
```

12. On-going transmission on a channel MUST be stopped before commencing transmission on another channel or on the same channel or switching to the sensing mode. To stop transmission on a channel, use

```
>> Acpi_ChannelTxStop
```

IV. Recovery

13. When ATSC scan is running, Matlab may become unresponsive. Wait for the scan to finish. The Matlab will come back up after the scan finishes.

14. Otherwise, if the system becomes unresponsive, detach the USB cable, exit the GUI, then plug in the USB, and restart the GUI.

15. If the system still fails, detach the USB cable, exit the GUI, power down the hardware, reconnect the USB, then follow step 3 to 6 to initialize the system for measurements.